भारतीय मानक
Indian Standard

IS 9351 : 2022

निकेल क्लोराइड हेक्साहाइड्रेट, कीटनाशक ग्रेड — विशिष्टि

(पहला पुनरीक्षण)

Nickel Chloride Hexahydrate, Pesticidal Grade — Specification

(First Revision)

ICS 65.100.30

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

December 2022 **Price Group 5**

Pesticides Sectional Committee, FAD 01

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Nickel chloride hexahydrate is used as a general fungicide on agriculture crops.

This standard was first published in 1980. In this revision, the standard has been brought out in the latest style and format of the Indian Standards.

In the preparation of this standard due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

The composition of the Committee responsible for the formulation of this standard is listed in Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

NICKEL CHLORIDE HEXAHYDRATE PESTICIDAL GRADE – SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for nickel chloride hexahydrate, pesticidal grade.

2 REFERENCES

The standards, given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

IS No.	*Title*
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 8190 (Part 1) : 1988	Requirements for packing of pesticides: Part 1 Solid pesticides (*second revision*)
IS 10946 : 1996	Methods of sampling for technical grade pesticides

3 REQUIREMENTS

3.1 Description

The material shall be in the form of greenish crystals, free from extraneous matter.

3.2 The material shall also comply with the requirements given in Table 1.

Table 1 Requirements for Nickel Chloride Hexahydrate, Pesticidal Grade

(*Clauses* 3.2)

Sl No. (1)	Characteristics (2)	Requirement (3)	Method of Test, Refer to (4)
i)	Nickel (as Ni) content, percent by mass, *Min*	23.7	Annex A
ii)	Cobalt (as Co) content, percent by mass, *Max* *p*H of aqueous solution, *Min*	0.5	Annex B
iii)	Acid insoluble matter, percent by mass, *Max*	3.75	Annex C
iv)	Iron (as Fe) content, percent by mass, *Max*	0.05	Annex D
v)		0.02	Annex E

4 PACKING

The material shall be packed as per the requirement given in IS 8190 (Part 1).

5 MARKING

5.1 The containers shall be securely closed and shall be bear legibly and indelibly the following information:

a) Name of the material;
b) Name and address of the manufacturer;
c) Batch number;
d) Date of manufacture;
e) Date of expiry;
f) Net quantity; and
g) Nominal nickel content, percent (*m/m*);
h) Cautionary notice as worded in the *Insecticides Act*, 1968, and Rules framed thereunder; and
j) Any other information required under the Legal Metrology (Packaged Commodities) Rules, 2011.

5.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

Representative sample of the material shall be drawn according to IS 10946.

7 TESTS

7.1 Tests shall be carried out as prescribed in co1 4 of Table 1.

7.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF NICKEL (as Ni) CONTENT

A-1 PRINCIPLE

Nickel is determined by gravimetric method using dimethylglyoxime as precipitating agent.

A-2 REAGENTS

A-2.1 Dilute Sulphuric Acid — 10 percent (*v/v*).

A-2.2 Tartaric Acid

A-2.3 Ammonium Hydroxide — Relative density 0.90.

A-2.4 Dimethylglyoxime Solution — 1 percent (*m/v*) solution in alcohol.

A-3 PROCEDURE

Weigh accurately about 2 g of the crushed and well-mixed material. Dissolve in water, add 2 ml of dilute sulphuric acid and dilute to 250 ml. Take a 25 ml aliquot, add 0.5 g of tartaric acid, neutralize with ammonium hydroxide, and then make just acidic with dilute sulphuric acid adding 10 drops in excess. Dilute to 250 ml. Heat to 70 °C and add 30 ml of dimethylglyoxime solution. Add ammonium hydroxide dropwise, until smell of ammonia persists, then add 5 ml of ammonium hydroxide and stir well. Allow the precipitate to settle and the solution to cool to 25 °C to 30 °C. Filter through a sintered glass crucible (G No. 3). Wash the precipitate with water (at about 25 °C) till free from chlorides. Dry the crucible at 110 °C to 120 °C to a constant mass.

A-4 CALCULATION

Nickel (as Ni) content, percent by mass

$$= \frac{203.2\,M_1}{M_2}$$

where

M_1 = mass in g of the precipitate, and
M_2 = mass in g of the material taken for the test

ANNEX B

[*Table* 1, *Sl No.* (ii)]

DETERMINATION OF COBALT (as Co) CONTENT

B-1 PRINCIPLE — Cobalt is determined by iodometric method.

B-2 REAGENTS

B-2.1 Potassium Hydroxide Solution — 10 percent (*m/v*).

B-2.2 Acetic Acid — Glacial.

B-2.3 Potassium Nitrite Solution — 50 percent (*m/v*).

B-2.4 Ammonium Nitrate Solution — 5 percent (*m/v*).

B-2.5 Standard Potassium Permanganate Solution — 0.1 N freshly standardized.

B-2.6 Dilute Sulphuric Acid — 10 percent (*v/v*).

B-2.7 Potassium Iodide

B-2.8 Standard Sodium Thiosulphate Solution — 0.1 N.

B-2.9 Starch Indicator Solution

B-3 PROCEDURE

B-3.1 Weigh accurately about 1 g of the material, dissolve in 30 ml of water and minimum volume of dilute sulphuric acid, add 1 ml of potassium hydroxide solution, then add 2 ml of glacial acetic acid and heat to boiling. Add 10 ml of potassium nitrite solution, stir and digest on a steam-bath for 30 minutes. Allow to stand overnight. Filter through a sintered glass crucible (G No. 4) and wash with small quantities of cold ammonium nitrate solution containing 1 percent by volume of glacial acetic acid until free from nitrite. Place the crucible in the beaker in which precipitation was carried out, add exactly 50 ml of standard potassium permanganate solution and 25 ml of dilute sulphuric acid, and then add sufficient water to cover the crucible. Heat to about 50 °C until the yellow precipitate has dissolved, then cool and add 1 g of potassium iodide.

Titrate the liberated iodine against standard sodium thiosulphate solution, using starch as indicator.

B-3.2 Carry out a blank titration with the same volumes of standard potassium permanganate solution and dilute sulphuric acid and potassium iodide in the same manner as with the sample.

B-4 CALCULATION

Cobalt (as Co) content, percent by mass

$$= \frac{0.536\ N\ (V_1 - V)}{M}$$

where

N = normality of standard sodium thiosulphate solution;
V_1 = volume in ml of standard sodium thiosulphate solution used in the blank titration;
V = volume in ml of standard sodium thiosulphate solution used in the titration with the material; and
M = mass in g of the material taken for the test.

ANNEX C

[*Table* 1, *Sl No.* (iii)]

DETERMINATION OF *p*H OF AQUEOUS SOLUTION

C-1 APPARATUS

***p*H Meter** — with glass electrode.

C-2 PROCEDURE

Place 5 g of the material in freshly boiled and cooled distilled water, dilute to 25 ml and mix. Determine the *p*H value of the solution with the *p*H meter at 25 °C.

ANNEX D

[*Table* 1, *Sl No.* (iv)]

DETERMINATION OF ACID INSOLUBLE MATTER

D-1 PRINCIPLE

D-1.1 The material is dissolved in acidified water and the residue left on filtering is weighed.

D-2 REAGENTS

D-2.1 Dilute Hydrochloric Acid — 10 percent (*v/v*).

D-3 PROCEDURE

Weigh accurately about 10 g of the material and dissolve in 125 ml of water and 1 ml of dilute hydrochloric acid. Heat the solution to boiling. Filter through a weighed and prepared Gooch crucible, or sintered glass crucible (G No. 4) and wash the residue thoroughly with hot water. Dry the crucible at 110° C ± 5 °C to a constant mass.

D-4 CALCULATION

Acid insoluble matter, percent by mass

$$= \frac{100\ M_1}{M}$$

where

M_1 = mass in g of the residue, and
M = mass in g of the material taken for the test

ANNEX E

[*Table* 1, *Sl No.* (v)]

DETERMINATION OF IRON (as Fe) CONTENT

E-1 PRINCIPLE

Iron (as Fe) is estimated by calorimetric method, using ammonium thiocyanate.

E-2 APPARATUS

Nessler's Cylinders — 50ml capacity.

E-3 REAGENTS

E-3.1 Concentrated Hydrochloric Acid

E-3.2 Concentrated Nitric Acid

E-3.3 Ammonium Hydroxide — 1 : 4 (*v/v*).

E-3.4 Dilute Ammonium Hydroxide — 1 : 10 (*v/v*).

E-3.5 Dilute Hydrochloric Acid — approximately 4 N

E-3.6 Ammonium Persulphate

E-3.7 Ammonium Thiocyanate Solution — approximately 5 percent (*m/v*).

E-3.8 Standard Iron Solution

Dissolve 0.702 g of ferrous ammonium sulphate [$FeSO_4$ $(NH_4)_2SO_4.6H_2O$] in about 100 ml water containing 10 ml of dilute sulphuric acid 10 percent (*v/v*) and dilute to 1 000 ml. One ml of the solution will contain 0.1 mg of iron (as Fe).

E-4 PROCEDURE

E-4.1 Dissolve exactly 1 g of the material in 20 ml of water. Add 2 ml of concentrated hydrochloric acid and 5 drops of concentrated nitric acid. Heat to boiling and add sufficient ammonium hydroxide to precipitate completely. Filter and wash the precipitate with dilute ammonium hydroxide until the washings are colourless. Dissolve any precipitate on the filter paper in 5 ml of hot dilute hydrochloric acid and dilute with water to about 20 ml. Transfer to a Nessler cylinder and dilute to the mark. Add about 30 mg of ammonium persulphate and 3 ml of ammonium thiocyanate solution and mix.

E-4.2 Carry out a control test in the other Nessler cylinder, proceeding as with the material, using 2 ml of standard iron solution. The limits prescribed in the requirements shall be taken as having not been exceeded, if the intensity of colour produced with the material is not greater than that produced in the control test.

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Pesticides Sectional Committee, FAD 01

Organization	*Representative(s)*
Directorate of Plant Protection Quarantine and Storage, Faridabad	DR RAVI PRAKASH (***Chairperson***)
All India Biotech Association, New Delhi	SHRI SAURABH SINGHAL SHRI SHAH JI DHAR (*Alternate*)
Central Insecticide Board and Registration Committee, Faridabad	SECRETARY DR VANDANA SETH (*Alternate*)
Central Insecticide Laboratory, Faridabad	DR ARCHANA SINHA SHRI SUBHASH CHAUDHARY (*Alternate*)
Consumer Guidance Society of India, Mumbai	SHRI SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Crop Care Federation of India, New Delhi	DR J. C. MAJUMDAR
Crop Life India, New Delhi	SHRI ASITAVA SEN MS NIRUPAMA SHARMA (*Alternate*)
CSIR-Indian Institute of Toxicology Research, Lucknow	DIRECTOR DR SHEELENDRA P. SINGH
Food Safety and Standards Authority of India, New Delhi	ADVISOR (STANDARDS)
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Indian Institute of Packaging, Mumbai	DR TANWEER ALAM
Indian Pest Control Association, New Delhi	SHRI UDAYAN GHOSH
Institute of Pesticide Formulation Technology, Gurgaon	DR M. VAIRAMANI
Ministry of Agriculture, Department of Agriculture, Chennai	JOINT DIRECTOR OF AGRICULTURE (RES) DEPUTY DIRECTOR LAB (*Alternate*)
National Centre for Integrated Pest Management, New Delhi	DR SUMITRA ARORA
National Institute of Plant Health Management, Hyderabad	DR MAHESH SAINI MS T. SRIDEVI (*Alternate*)
Pesticide Manufactures and Formulators Association of India (PMFAI), Mumbai	DR ARCHANA SRIVASTAVA DR UDAY KUMAR (*Alternate*)

Organization	*Representative(s)*
Regional Pesticides Testing Laboratory, Chandigarh	SHRI V. VASU
In Personal Capacity (*4-6-90/2/8/2, Sri Devi Nilayam Tejaswinagar Coloni, Attapur, Hyderabad – 500048*)	SHRI C. V. RAO
In Personal Capacity (*263, Sector 28, Faridabad – 121008*)	SHRI VIPIN SAINI
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Member Secretary
SHRI KULDEEP MITTAL
SCIENTIST 'B'/ ASSISTANT DIRECTOR
(FOOD AND AGRICULTURE DEPARTMENT), BIS

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

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